

# The Use of Video Self-Monitoring Embedded with Mentorship as a Medium to Enhance Experiential Learning Opportunities and Promote Critical Thinking Skills for Educators and Health Science Professionals Working with Children with Autism

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## Abstract

The increased prevalence of autism has created an increased challenge for teachers to incorporate specialized teaching strategies to address the unique educational and behavioral challenges facing children diagnosed with autism. Providing teachers with educational training opportunities will promote such learning. In the academic world, experiential learning opportunities are used to provide a bridge between didactic coursework and on-the-job practice that fosters skill acquisition and critical thinking. Video self-monitoring (VSM) is one type of learning strategy used in experiential learning environments to develop critical thinking by building on direct experiences, performance feedback (PF), and reflection (R). This study investigated the impact of an experiential teacher training package, consisting of VSM, PF, and R with and without mentoring on sustained and generalized teacher performance of two dependent variables – Learn Unit (LU); Rate of Effective Instruction (ROI). In this exploratory study 6 female teachers instructed seven 3-5 year-old autistic children. Teacher performance on LU and ROI was evaluated three times: Phase 1, after a 2-hour workshop; Phase 2, after training- using the VSM. PF, R with and without mentoring; Phase 3 – follow-up with VSM. PF, R and mentoring removed. Findings revealed that while VSM, PF, R appeared to enhance teacher performance and sustainability of procedural integrity, the greatest and most consistent improvement was observed among teachers who received mentoring as opposed to those who did not. Practical applications of this experiential learning teacher/educator training package for the advanced education of teachers and health science professionals working with this population are highlighted.

## Keywords

training, mentoring, Autism Spectrum Disorders, experiential, video self-monitoring

## Introduction

Autism spectrum disorder (ASD) is on the rise with 1 in 68 children nationally being diagnosed with ASD as stated by the Centers for Disease

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and Control (CDC, 2014). The increased prevalence in addition to the complexity of the educational and behavioral characteristics associated with ASD requires educators to incorporate evidence-based specialized instructional tools and behavioral intervention strategies to meet the needs of children with ASD. Recently, the 2014 CDC report also identified growing cultural diversity and intellectual disabilities as additional factors that impact children with ASD abilities and their educational needs (AAP, 2006, updated 2010; Croen, Najjar, Ray, Lotspeich, & Bernal, 2006; & Love, Carr, Almason, & Petursdotir, 2009).

Increasing students' foundational and practical knowledge, developing their functional skills and expanding their critical thinking skills are several of the key factors educators seek to develop via their learning environments (Pinto Zipp, Maher, Donnelly, Fritz, & Snowdon, 2016). One way that has been explored as a way of developing student's practical knowledge and skill application is to engage them in active learning experiences via what is termed the experiential education processes (Association for Experiential Education – AEE). Experiential Learning (education) promotes critical thinking by engaging the learner in a four stage process which begins with reflection, followed by deductive reasoning, then inductive reasoning, and ultimately in analysis (Koo & Thacker, 2008). Haynes (2007) further described the steps associated with experiential learning as: experiencing/exploring (“doing”); sharing/reflecting (“what happened?”); processing/analyzing (“what’s important?”); generalizing (“so what?”); and application (“now what?”). During the experiential learning process, the instructor, mentor or teacher acts as a facilitator in the process who engages and allows the student to share the experience, assess, discover, analyze and reflect upon

current and future changes in the learning based on the outcome (Wurdinger & Carlson, 2010).

A theoretical underpinning to experiential learning is negative knowledge theory. Negative knowledge theory stipulates that engaging in experiential learning opportunities and reflective processes allows the learner to analyze, re-evaluate prior episodic knowledge and experiences, and make decisions by avoiding errors, then selecting those desirable actions to be executed in future situations (Dewey, 1933; Gartmeier, Kipfmueller, Heid, & Gruber 2008; & Hetzner Gartmeier, Heid, & Gruber, 2010). This error recognition learning model fosters what is called an error prevention capacity, whereby the learner develops competent judgment capacity for early detection of the precursors of errors which is shown to promote professional development and expertise, fostering improved competence, new learning and behavioral change (Boud, 1999; Gartmeier et al. 2008).

According to the 10.20.70 Learning and Development Model (Lombardo M. M., Eichinger, R. W., 1996), 10% of learning happens in formal instruction through lectures and readings, 20% through informal social discussions and practice, and 70% is actualized and retained by experiencing the skill and doing it while receiving feedback and mentorship. Not surprisingly, experiential learning environments and the underlying concepts associated with theories describing experiential learning have been used to design learning environments to address the needs of children with ASD in the school environment. However, limited evidence was found in the literature addressing teacher/educator training models incorporating experiential learning that addressed the special needs of children with ASD. Clearly, one of the critical components in the functional, cognitive and social development of children with ASD is teacher/educator training (Institute of Medicine Global Forum on Health Professions Education,

Interprofessional Education for Collaborative, 2013; Kates-McElrath & Axelrod, 2008; & Reid et al., 2005).

## Literature Review

Generally, the literature speaks to individual teacher/educator training procedures which embed experiential learning opportunities and have found positive improvements in teacher performance and procedural integrity (PI) (Cooper, Heron, & Heward, 2007; Gresham, 1989; & Hagermoser Sanetti & Kratochwill, 2009). Namely, (1) video self-monitoring (VSM), whereby an individual creates a video tape of him/herself performing a target behavior or function then reviews it to analyze and rate performance and procedural integrity (Ahearn, 2010; & Pelletier, McNamara, Braga-Kenyon, & Ahearn, 2010); (2) self-evaluation/self-monitoring (Krause, & Stark, 2010), defined as a self-regulated learning procedure that involves having an individual compare his/her performance against a standard or norm and making changes in his/her learning experience based on his/her informed perceptions of the quality of expected performance (Kitsantas & Zimmerman, 2006); (3) performance feedback (PF) defined as the process of monitoring and evaluating target behaviors against objective benchmarks and having a mentor provide frequent and immediate corrective feedback to the individual regarding these behaviors (Coddington, Feinberg, Dunn, & Pace, 2005; Coding, Livanis, Pace, & Vaca, 2008; Kitsantas, et al., 2006; Krause & Stark, 2010; Noell, G. H., Slider, Connell, Gatti, Williams, Koenig, & Resetar, 2005; Reid et al., 2006; & Wilkinson, 2007); and (4) reflection (R) which involves problem solving and self-analysis of one's behavior (Dewey, 1933; Gartmeier et al., 2008; Hetzner et al., 2010; Janssen, de Hullu, & Tigelaar, 2008; Pedro, 2005; & Stoddard, 2002).

Although teacher/educator training procedures have been shown to be effective in improving teacher performance and increasing procedural integrity, a review of the literature revealed that several limitations and gaps have been noted. These include the following: small sample sizes, disparity in the settings, lack of standardization, varied methodologies in the implementation process, few studies conducting component analysis, inconsistent follow up measures, lack of an established theoretical staff training model, disparity among understanding the construct of mentorship, and lack of studies that utilize component analysis to isolate the influence of mentorship on behavior change. Finally, the literature points to the lack of an established standardized teacher/educator training package (Leblanc, Gravina, & Carr, 2009; Reid et al., 2005; & Reid & Parsons, 2006).

Building upon Reid et al. (2006) statements supporting the need for effective teacher training, the authors suggest that a teacher/educator training package that incorporates experiential learning opportunities can provide teachers with self-directed active learning opportunities that will ultimately assist them to foster and promote knowledge building, critical thinking skills, and the functional application of learned skills in children with ASD.

Thus, the purpose of this study was to explore the effect that an experiential learning teacher/educator training package consisting of VSM, PF and R, with and without mentoring has on ASD teacher performance as measured by two dependent variables: (1) application of the learn unit (LU) an interlocking three-term contingency that consists of the teaching staff's antecedent, the student's response, and the consequence (Greer, 2002; Greer & Ross, 2008; & Ross, Wilson, Goodman, & Greer, 2007); and (2) rate of effective instruction (ROI) which

refers to both rates of correct and incorrect LU presentation and reflects on the teacher's effectiveness of instruction (Greenwood, Horton, & Utley, 2002; & Petscher & Bailey, 2006). Practical and theoretical implications for experiential learning are discussed.

## Methods

### Subjects and Setting

Six female student teachers instructing seven 3-5 year-old children diagnosed with ASD, who attended two private schools utilizing principles of applied behavior analysis participated in this exploratory study (Mean age = 32 years; Age range = 23 years – 38 years). In this study, student teachers will be referred to as 'teachers' and the children who participated in this study will be referred to as 'students'.

### Variables

Two dependent variables in this study, (1) LU accuracy and (2) ROI, were measured against the independent variable of PTR/Mentoring.

### Instrument and Material

*The Teacher Performance Rating Scale Accuracy Scale (TPRA) – Abbreviated Version* (Ingham & Greer, 1992) was used to measure teacher's performance on the implementation of LU and the ROI (DiGennaro, Martens, & Kleinman, 2007; Leblanc, Ricciardi, & Luiselli, 2005; & Plavnick, Ferreri, & Maupin, 2010). Video recordings of the teacher-student interactions were performed using a Canon PowerShot SX280 12 MP digital camera, which were then transferred via a USB connector onto a laptop for analysis.

### Procedure and Design

In Phase 1 of the study teachers attended a two-hour training workshop on the LU and ROI, VSM, and scoring procedures (pre-training baseline – workshop). In addition to presenting

information in a lecture format, the workshop adhered to the typical four-component protocol of Behavior Skills Training (BST) when teaching new skills. Specifically, Phase 1 used (1) instruction such as step-by-step instruction and procedural checklist (Homblitas, Rosales & Candel, 2014; Howard and Reed, 2014; & Graff and Karsten, 2012), (2) modeling via video and in-vivo modeling (Himle & Wright, 2014), (3) rehearsal (Nabeyama & Sturmey, 2010), and (4) feedback (Hsieh, Wilder & Abellon, 2011). The model-rehearsal-feedback was repeated until the student teachers performed with 80% accuracy, over two occasions, on the scoring of LU implementation and rate of instruction, which met inclusion criteria for phase 2 of the study.

In Phase 2, teachers were randomly assigned to either the intervention or the control group (post-training reinforcement – training: experiential phase-skill acquisition). Each teacher in the intervention group was videotaped instructing a student in the classroom for the duration of three minutes. A three-minute observation was selected as it provided a meaningful and non-disruptive presence within the classroom environment (Coddington et al., 2008; Catania, Almeida, Liu-Constant, & DiGennaro-Reed, 2009; DiGennaro-Reed, Coddington, Catania, & Mahire, 2010; DiGennaro et al., 2007; Kate & Fiske, 2008; Lerman, Tetrault, Hovanetz, Strobel, & Garro, 2008; & Pelletier et al., 2010; & Ross, Singer-Dubek, & Greer, 2005). An independent expert rater/observer analyzed each videotaped session on that same day. Concurrently, a performance feedback process in line with BST applications was conducted by having each teacher score and rate her performance using the *TPRA* form. The mentor was present during this process and provided feedback and mentoring on the performance outcome following a predetermined formal script and procedural checklist, in line with Haynes's

(2007) steps of experiential learning. Namely, (1) exploring and observing the practical “doing” experience via VSM, (2) sharing and reflecting on the performance observed by scoring and rating the videotaped instruction, (3) processing and analyzing the delivery process of instruction (Roscoe, et al., 2006), paired with immediate corrective feedback by the mentor for scoring and self-assessment (Nabeyama et al., 2010), (4) generalizing by informing and reflecting on correct as well as incorrect performance (Miles & Wilder, 2009), and (4) reflecting upon next steps building upon critical thinking skills by delineating strengths and recommendations for future applications. After the performance feedback and mentoring session, the teachers completed a brief written reflection journal responding to three written prompts.

Corrective feedback in this study consisted of constructive direct feedback and direction, in the form of vocal, written instruction and modeling (Reid, 2005), following the model of behavioral consultation (Coddington et al., 2008; and Noell et al., 2005), answering any questions the teacher may have, and posing questions for the teacher to reflect upon during the review session (Reid et al., 2005). Phase 2 was implemented over four consecutive days and was 15 minute in duration per teacher per day.

Each teacher in the control group followed the same process, as the intervention group, however, although they were offered the procedural checklist to guide them in their scoring, they did not receive mentoring on their performance feedback. Strengths and recommendations were identified by the teacher alone and were written down by the teachers

only, following a predetermined procedural script (Slim, 2014).

In Phase 3 (follow-up: sustainability) all teachers were videotaped for a 3-minute teacher-student interaction once every four days over 21 days. The teachers were not required to score their instruction or complete a reflection journal. The independent rater/observer scored the teachers’ performance.

### Data Analysis

The teachers used the strategy of video self-monitoring and self-recording to score their performance on LU implementation and ROI, following a procedural checklist (Appendix A). LU percent accuracy and ROI scores were derived using simple algorithmic computations based on the literature (Greer, 2002). The Rate of Effective Instruction (ROI) was calculated in this study using the following formula:

$$\text{Rate of Effective Instruction} = \frac{\text{LU Correct} - \text{LU Errors}}{\text{Duration (minutes)}} = \text{Number of LU/min.}$$

A negative outcome indicated that there were more incorrect LU presentations than correct LU presentations. A positive outcome indicated that there were more correct LU presentations than incorrect LU presentations. Pre- and Posttest measures were conducted at every session across all phases of the study.

### Results

Quantitative data from this study is presented in Figure 1 which illustrates the average scores for teacher’s performance of LU and ROI for the intervention and control groups in all three phases of the study.

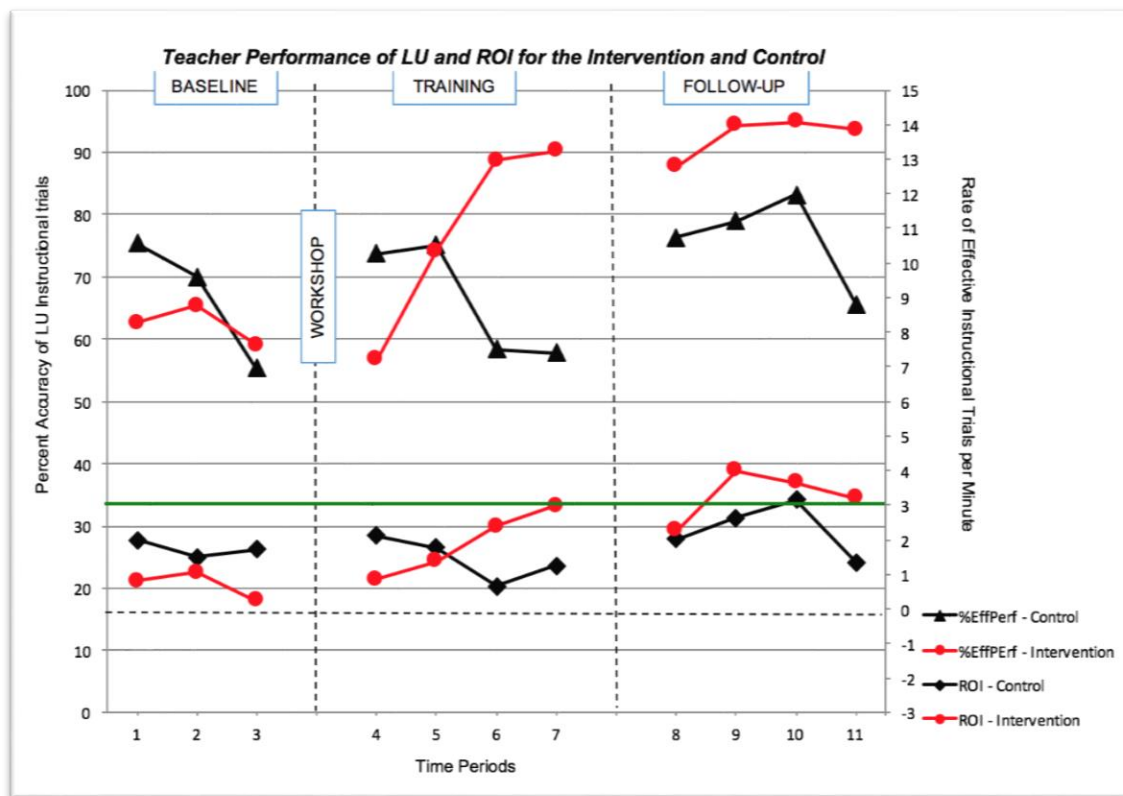


Figure 1. Average scores of teacher performance of LU implementation and ROI for the intervention and control groups across all phases of the study.

Only 50% of the participants showed an increase in LU implementation and ROI after attending the pre-training workshop.

Teacher training with mentoring (e.g., experiential learning component) was observed to lead to the greatest improvement with most consistent performance among teachers as noted by averaging the teacher's scores over the four days. Interestingly, all three mentored teachers demonstrated increased scores above 80%, which were maintained over 21 days, whereas following teacher training without mentoring one of the three teachers reached scores above

80%, the other two teachers reached a score of 80% in only one session. Moreover, the scores of the teachers that did not receive mentoring demonstrated great variability and were not sustained at above 80% over time. Teacher training with mentoring was also observed to enhance teacher performance and procedural integrity with sustainable outcomes (teacher training with mentoring improved by 50%; teacher training without mentoring improved by 15%). Table 1 and 2 depict the average scores of teacher performance on the LU implementation and ROI for phase 2.

Table 1

*Mean percent LU scores in the teacher's performance for the intervention and control groups in all phases of the study.*

TEACHERS	PHASE 1	PHASE 2	PHASE 3
Control Gp.	Sessions 1,2,3	Sessions 4,5,6,7	Sessions 8,9,10,11
TC1	48%	49%	70%
TC2	73%	61%	71%
TC3	80%	88%	86%
Interv. Gp.			
TI1	79%	83%	96%
TI2	72%	79%	89%
TI3	36%	66%	94%

Table 2

*Mean ROI per minute scores in the teacher's performance for the intervention and control groups in all phases of the study.*

TEACHERS	PHASE 1	PHASE 2	PHASE 3
Control Gp.	Sessions 1,2,3	Sessions 4,5,6,7	Sessions 8,9,10,11
TC1	1.4	0.1	2.8
TC2	1.1	1.1	2.4
TC3	2.8	3.2	2.9
Interv. Gp.			
TI1	1.5	2.3	3.5
TI2	1.8	2.5	4.2
TI3	-1.3	1	2.2

Over time (21 day follow up) procedural integrity of LU presentation and ROI showed improvement with mentoring (3/3 teachers who received training with mentoring vs. 2/3 teachers who received training without mentoring). Teacher training without mentoring was observed to lead to greater variability in performance and average scores below 80% in LU implementation and ROI below 3 instructional trials per minute in two of the three teachers. However, interestingly, and in support

of the literature of using antecedent-only methods for teacher training (Collins, Higbee & Salzberg, 2009; Greer et al., 2002; and Weldy, Rapp & Capocasa, 2014), learning was observed while engaging in the teacher training alone without mentoring and feedback. Overall, teacher training paired with mentoring that is experientially based was observed to lead to consistent and sustained higher scores than *without* mentoring. Tables 1, 2, and 3 depict the

average scores of teacher performance on the LU implementation and ROI for phase 3.

Table 3

*Average scores of the teacher performance of LU and ROI for the intervention and control groups.*

TEACHERS	PHASE 1		PHASE 2		PHASE 3	
Control Gp.	Sessions	1,2,3	Sessions	4,5,6,7	Sessions	8,9,10,11
	LU	ROI	LU	ROI	LU	ROI
	67%	1.8	66%	1.5	76%	2.7
Interv. Gp.						
	LU	ROI	LU	ROI	LU	ROI
	62%	1.1	76%	1.9	93%	3.3

Qualitative data extrapolated via themed analysis from daily teacher reflection journals written during phase 2 were used to understand social validity and acceptability based upon teacher perceptions of the experience. Specifically, the teachers were asked to reflect on their observed behavioral performance, provide insight and resolutions for providing corrective measures and solutions, and state their impressions regarding the experientially based teacher/educator training package used in this study. This reflective exercise incorporated the notions associated with mindfulness (Dewey, 1933) and thus supported one of the constructs of experiential learning (Haynes, 2007; & Koo & Thacker, 2008).

It is noteworthy that the teachers' personal experience and learning was reflected in their comments, namely in their analysis and identification of ways to enhance correct LU implementation and increase in ROI over future sessions. Overall, the teachers stated that the experiential component of the staff training model was "Very inspiring, insightful, rewarding and effective", "A quality one, based on my observations of positive results in the child's responses and my instruction", "Offers me an opportunity to be accountable for my behavior

and room for improvement", and that mentoring and feedback was "Helpful to review together for insight and feedback", "Helpful to point out areas to be improved and corrected", that it "Shows what we do vs. what we think we do", and that it was "Professionally and respectfully handled".

## Discussion and Conclusion

The findings of this study exploring experiential learning teacher educator training package using VSM, PF, reflection and mentoring for teachers working with children diagnosed with ASD supports mentoring as a positive experience that compliments existing experiential teacher training. These findings extend the experiential learning research findings of Lerman et al. (2008) and Pelletier et al. (2010) by supporting its use in teacher training and more specifically for those teachers working with children with ASD. We suggest that providing experiential learning training opportunities with mentoring for teachers, regardless of the population they teach, may be beneficial in supporting and building the foundational skills needed for long term effective teaching. Moreover, based on the teachers' comments, we propose that the key to this training package is the building of the



teachers' self-reflective critical thinking skills and their capacity for error detection and prevention.

## **Clinical Relevance and Implications**

For educators and instructional personnel and health science professionals working with children with ASD many forms of training opportunities are vital. Yet, those opportunities embedded in the experimental learning theory that utilize video self-monitoring, performance feedback paired with mentoring and self-reflection, lead to enhanced critical thinking skills required for professional and personal growth as an educator and health science professional.

## **Limitations**

The primary limitations of this study include small sample size, the study design, sampling method and duration of the training protocol.

## **Sampling Methods**

Participants were recruited using a "Convenience Sampling" method, recruiting volunteers from two geographically accessible private educational settings. Although it is the nature of these kinds of studies to recruit from naturalistic settings to maximize external validity, a convenience sampling method combined with a limited sample size and a small age range selection limit external validity of the findings.

## **The Possibility of Participants' Observer Reactivity**

The presence of an observer videotaping the teacher-student interactions may have influenced the participant behavior by creating an observer reactivity bias. This bias may be addressed in future studies by having the participants blind to the videotaping procedure,

and/or by hiding the camera and placing the videotape behind a one-way mirror.

## **Treatment Package Used**

This study used a treatment package consisting of the staff training procedures of VSM, SE, PF, R and Mentoring. A component analysis was not conducted, although mentoring was independently manipulated. Therefore, this study did not assess the independent effect of engaging in reflective processes, on teacher behaviors. Future studies will need to conduct component analysis to address the effect that a staff training package consisting of VSM and PF has on teacher performance with and without reflection when mentoring is absent.

## **Duration of Mentorship**

There are no empirical studies in support of a specific duration for receiving mentorship. Future research is needed to identify effective mentorship duration.

## **Duration of Follow-up Phase**

The duration of follow-up phase might have been an interfering limiting factor. This study conducted follow up over a 21 days. This period may not be sufficient to assess the long-term impact of Mentoring on Procedural Integrity. The literature points to follow-up phases ranging from 1 week to 6 months. Future studies should address the differential effects of follow up period durations.

## **Future Direction**

This exploratory study provided a platform for future research to further investigate this experiential learning teacher/educator training package when working with children who require different teaching and learning strategies to address their diverse educational and behavioral needs.

While, the evidence discussed in this study must be considered as preliminary, implementing and assessing the effectiveness of diverse teacher education strategies is critical to effectively address the educational and behavioral problems facing individuals with ASD.

## Acknowledgement

We would like to thank the teachers for their time participating in the study and who embraced the new learning presented, and the administrators of the schools that have graciously welcomed us to conduct the study at their facility to better meet the needs of the students. We would like to thank all the families who kindly allowed their children to participate in the study and to support the teacher's education of evidence-based strategies to promote successful student outcome.

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## Appendix A

### Performance Feedback Script and Score Form for LU/EC

#### Answer with Yes or No to the following questions:

1. Did you obtain the student's Attention before presenting the antecedent ☐Yes ☐No
2. Did you present flawless Antecedents, including written or vocal stimuli ☐Yes ☐No
3. Did you wait 3 seconds for the student to initiate a response ☐Yes ☐No
4. Did you immediately present Reinforcement after correct responses ☐Yes ☐No
5. Did you follow the Error Correction procedure after incorrect responses ☐Yes ☐No

6. Did you immediately give a Correction by presenting the Antecedent again, modeling the correct response, and ensuring that students emit the correct response ☐Yes ☐No
- 1) Did you abstain from reinforcing the corrected response ☐Yes ☐No
- 2) Did you immediately introduce the next Learn Unit after the modeled corrected response ☐Yes ☐No
7. Did you move quickly to the next Learn Unit ☐Yes ☐No
8. Did you continue this sequence until the predetermined number of LU is presented ☐Yes ☐No

**Performance Feedback Score:**

**Total:** \_\_\_\_\_ / 10 = \_\_\_\_\_ % acc.